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WILMON NEWELL, Director
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SPRAYING TO CONTROL GRAPE ROTS IN FLORIDA VINEYARDS

By KENNETH W. LOUCKS
Assistant Plant Pathologist, Florida Experiment Station

There are several important diseases of grapes which attack the foliage and fruit at different stages in their development. Consequently, it is necessary to keep the fruit protected with a fungicide throughout its period of growth. Experiments conducted during the past three years have shown that it is necessary to spray them thoroughly and at frequent intervals to obtain a profitable yield of marketable fruit.

Of the serious grape diseases in Florida, **anthracnose** is the first one to become noticeable in the spring. It attacks the young leaves and shoots and forms sunken spots varying in color from dark reddish-brown to black. When the fruits appear, it attacks them, causing the well-known bird's eye spot. Anthracnose is important in Florida only on the vinifera varieties of grapes.

Black rot is the next serious disease to appear. Its presence is indicated by typical round brownish spots on the leaves. When the fruit has reached the size of peas or larger, black rot makes its appearance on the berries as a pale green, sometimes white, spot. The spots turn brown and then black, spread over the entire berry and, if the berry does not fall off, cause it to shrivel up and form the black mummied fruit so common with this disease. Black rot is more or less serious on all grapes that are grown commercially in Florida, except the Carman, which seems to be very resistant.

Bitter rot and **ripe rot** may appear upon the berries at any time after they are nearly full size and especially when ripening. These rots develop first as pale green spots which enlarge, and turn darker as they finally involve the entire berry. The affected berry shrivels up but does not dry out so much as the ones affected with black rot. Also, more shelling of the fruit is caused by them than by black rot. The symptoms of these two diseases and their control are so much alike that no attempt will be made to describe them separately. They attack all Florida-grown grapes and observations show them to be of serious economic importance. Since they develop late in the season control by spraying is rather difficult during rainy seasons because it is impossible to keep a fungicide on the berries without a sticker and, when a sticker is used, the residue may lower the value of the fruit.

CONTROL

The first fungicide to be applied for the control of grape diseases is a solution of bluestone (4 pounds to 50 gallons of water) to which a good sticker has been added. The vines should be drenched with this material. It should be applied after the prunings have been gathered and burned and as late in the spring as possible before the buds burst but never later, as it will burn the tender growth. Spraying with bordeaux 4-4-50, without a sticker except as indicated in the schedule below, must be started as soon as the foliage develops to any appreciable size, at least as soon as the flower buds have separated from each other in the bloom cluster. From then on applications should be made at intervals as indicated below until the fruit reaches about full size. During ordinary seasons, a total of nine applications of spray should give ample protection. If the season should be especially wet, probably the intervals between applications should be shortened and a greater number of applications put on.

Although bordeaux gives the best control, usually it should not be applied after the fruit attains full size, because the conspicuous residue may adhere until the fruit is picked and reduce its market value. To avoid this difficulty, neutral copper acetate, a non-staining material, may be substituted and used at the rate of 2 pounds per 50 gallons of water. This material needs a sticker added to it, but calcium caseinate should NOT be used. Cheap gelatine, 2 ounces to 50 gallons of spray, or one-fourth pound of soap per 50 gallons, may be used.

After the dormant spray, an effort should be made to cover both surfaces of the leaves and at the same time adjust the quantity of liquid applied to avoid drip from the foliage. No spray application should be omitted on account of rainy weather. Nearly always there is enough time between showers, especially during the forenoons, to put on some spray. When the spray is properly applied, it will dry in 20 to 30 minutes, and once it is dry the rains do not wash it off readily.

During the past season unsprayed vines in a certain vineyard yielded an average of .3 pounds of healthy grapes per vine, while the plots which received seven applications of spray yielded an average of 9.5 pounds per vine. Plots sprayed nine times yielded 10.4 pounds per vine. This increase in yield resulting from the two extra applications amounts to about 400 pounds of fruit per acre at a cost of $5.00. The cost per acre for each spray application will vary according to local price of labor and the amount of foliage which must be covered.

SPRAY SCHEDULE RECOMMENDED FOR CONTROL OF GRAPE DISEASES

Time of Application	Purpose	Materials to Use
I. On dormant vines, as late in the spring as possible before buds burst.	Kill spores of fungi which cause diseases on leaves, fruit and vines.	Copper sulfate, 4 lbs. to 50 gal. water, with a good sticker.
II. One week to 10 days after buds burst, or when the shoots are 8 to 18 inches.	Prevent infection of leaves, also control leaf skeletonizers and flea beetles.	4-4-50 bordeaux without sticker. Add 1 to 2 lbs. lead arsenate for chewing insects.
III. Bloom opening.	Prevent infection of leaves, blossoms and control insects listed above.	Same as above.
IV. Bloom open.	Prevent infection of leaves, fruit and control insects listed above.	Same as above.
V. Fruit just set.	Same as above.	Same as above**.
VI. Fruit about ½ size.	Same as above, also leaf folders.	Same as above.
VII. Fruit about full size.	Same as above, also sucking insects, such as leaf hopper and aphids.	Copper acetate, 2 lbs. to 50 gal. water, with 2 oz. gelatine as a sticker. Add ½ pint nicotine sulfate for sucking insects.
VIII. Fruit full size.	Same as above.	Same as above, except omit gelatine.
IX. As soon as fruit is harvested.	Control Isariopsis and other leaf spots.	4-4-50 bordeau with sticker, arsenate if needed for insects.

** If chewing insects are numerous after the fruit is set and it is not feasible to use arsenate as a poison for them, pyrethrum and derris extracts may be used effectively, especially against leaf skeletonizers.